

SIGNAL SECURITY

I. INTRODUCTION.

- A. The object of signal security is to prevent enemy intelligence gaining information from messages passing over our communication system and from the general layout of our communication system. The enemy intercept units consist of listening sets which work in conjunction with direction finding equipment. The chief danger is from enemy interception of our radio messages. Under circumstances favorable to the enemy, he may be able to get information by tapping in on wire circuits, by supervising these circuits by the use of the induction coil, by observing visual signals, and recording the volume of messages.
- B. Signal communication includes all means of transmitting messages from one friendly unit to another, except mail or personal agents.
- C. The term message includes all orders, reports, instructions, documents, photographs, maps, overlays, and sketches in plain language or code transmitted by means of signal communication.
- D. A message in the clear is one in which the text of the message conveys an intelligent meaning in a spoken language while a code message conveys no intelligible meaning. The word code includes codes and ciphers.
- E. Messages are classified as:
1. Urgent (O) and will be transmitted immediately upon receipt, or will follow any other urgent messages then being transmitted.
 2. Priority (P) and will be sent ahead of any routine messages on hand, but after those marked urgent.
 3. Routine (R) and are sent as soon as practicable. If no classification is marked on the message it will be assumed that the message is routine.
- F. The agencies of signal communication ordinarily available include the message center, radio communication, wire system, messenger service, visual signals and pigeon service.
- G. The transmission of field messages is facilitated by uniform arrangement of their contents. Irregularity in the address or authorization may delay transmission and increase the chance for error. The inclusion of the correct date and hour of origin is essential to a proper evaluation by the recipient of the message. The writer's serial number should always be included since it identifies the message for transmission and for reference.
- H. Messages should be very carefully prepared. They should be brief, complete, and clear. It is necessary to be extremely careful that they shall not be misunderstood. Messages should always be prepared in duplicate in order that the message center may keep a copy. Only authorized abbreviations should be used. The instructions in the inside of the cover of the field message book must be followed explicitly.

II. ACTION OF AN INTERCEPT UNIT.

- A. A radio, if carelessly used, can be a prolific source of information for the enemy. Periods of comparative quiet give enemy intercept units good opportunities for profiting by the careless use of radio. The method of working of an enemy intercept unit, during an immobile (stabilized) period is as follows:
1. All messages are recorded, and all station call signs, frequencies, and the bearings given by the direction finding equipment carefully noted. From a study of the procedure signals exchanged, and the volume of messages passed over each organization's radio network, it is possible to show the code names of the units which are served by each radio station; call signs and code names are thus linked together.
 2. The intercepted messages are carefully studied for clues as to the identity of the code names or call signs, and for direct information for the benefit of the Intelligence Staff.
 3. The above procedure can be followed to some extent even if the enemy intercept unit has no Direction Finders. During an immobile period, a good picture of the radio layout of an isolated organization can be built up quickly without Direction Finders, if the unit's radio sets are being freely used. If several units using their radio freely are in range of an enemy intercept unit, the enemy, unless he has Direction Finding equipment available, will be confused by the many calls and have difficulty in identifying and concentrating on the radio sets of the unit he is responsible for monitoring.

III. DIRECTION FINDING.

- A. The bearings recorded by the Direction Finding stations, which normally work in threes, are plotted at a central control point, the intersection of the bearings marking the location of the "target". While it is untrue that enemy Direction Finding equipment is so accurate that a radio station can be pin-pointed the moment it opens up, a well situated Direction Finding station can, under favorable conditions, obtain a bearing accurate within a few degrees. Direction Finding equipment is much less effective in mobile than in fixed positions. The chief uses of enemy Direction Finding stations are as follows:
1. While they cannot pin-point one of our radio stations, they can indicate the area in which it may be found. If many stations are found in one area, that would tend to indicate the presence of a headquarters. This the enemy would try to confirm by air reconnaissance.
 2. Detection of movement. One Direction Finding station within 20 miles of a "target" which it is continually monitoring can detect a movement of 2 or 3 miles.
 3. To re-identify a radio network which has carried out a simultaneous change of call signs, frequencies and code names.

- B. Local topographical, meteorological and mineralogical factors directly effect the efficiency of the Direction Finding equipment.

IV. RADIO COMMUNICATIONS.

- A. Since radio is portable and needs no wires, it is favored as a means of distant communication. Commanders should have a general knowledge of radio, its capabilities, and its limitations. The officer in direct charge of communication should have a practical knowledge of radio operation. He will be charged with the upkeep of the radio equipment of the unit and the training of all operating personnel.
- B. Factors, independent of enemy action which may limit the use of radio are:
 - 1. Lack of trained operators.
 - 2. Weather.
 - 3. Frequency.
 - 4. Lack of sufficient frequency channels for all stations.
 - 5. Presence of detrimental terrain features.
 - 6. The proximity of a source of radio static or interference such as power line or an X-ray machine, mineral deposits, etc.
- C. The enemy may limit the use of radio by using our transmissions for his own information. Radio messages can be intercepted by hostile stations and, unless the messages are coded they may gain information from the messages.
- D. In order to insure reliable radio communication the following conditions are the most satisfactory:
 - 1. Locate station in a quiet place.
 - 2. Locate station away from sources of radio interference such as power lines, electrical sub-stations, X-ray machines, mineral deposits, etc.
 - 3. If possible, locate station in a place where the antenna can be in the clear, preferably where it can be elevated above screening objects such as large buildings, hill masses; and dense woods.
 - 4. Locate station as far as practical in a place protected from artillery fire and air attacks.
 - 5. Select an alternate location for each radio station to avoid delay in the event it becomes necessary to move. The judgment and skill with which the radio station is located will usually be one of the most important factors affecting successful operation of the station.

6. The radio must not be overloaded with unimportant messages, or with messages which are better transmitted by other means.
7. Radio security can be greatly assisted by curtailing the use of radio, establishing dummy stations and sending false reports, rigid radio discipline, habitual use of codes and ciphers, and habitual use of simple prearranged codes during operations. Plain language messages sent during an immobile period are of the greatest help to the enemy in identifying units and code names. The most harmless looking administrative messages may be anything but harmless. Plain language messages containing references to "bombardier", "rifleman", regimental numbers, etc., have been intercepted by the enemy, and have compromised code names by giving the enemy definite indications of the type unit associated with these code names.

V. USE OF RADIO IN IMMOBILE AND MOBILE CONDITIONS.

- A. Encipher all messages before transmission. The use of radio should be severely restricted or even prohibited during immobile periods.
- B. During periods of rapid movement and battle, the maintenance of communication is more important than the danger of interception.
- C. Do not start mobile operations with call signs, code names and frequencies which have been in use for some time prior to the opening of the operations. This would make things much easier for the intercept units.

VI. GENERAL INSTRUCTION FOR THE USE OF RADIO.

The following rules give a general guide to the use of radio:

- A. Have a radio set that has a fairly long range and is capable of both radiotelegraph and radiotelephone transmission. The radio set should be capable of operation in the frequency range where there are frequency channels available.
- B. Radiotelegraph.
 1. Messages by radiotelegraph will be sent in code. All headquarters which may require the use of code are provided with the means of encoding and decoding messages. The use of any unauthorized code is forbidden.
 2. Messages may be sent in the clear by officers authorized to do so when speed is vital and it is believed that the enemy cannot take effective action on the messages if intercepted. Such messages must bear the notation "Send in Clear" above the author's initials, before the radio operator is authorized to complete the transmission.
 3. Messages dealing with operations in progress, when contact with the enemy has been made, may be sent in the clear by any officer by noting "Send in Clear" above his initials. Code names will, however, be used and necessary precautions taken to prevent the enemy from obtaining information.

4. Code names and call signs must be used.
5. There should be alternating periods of complete radio silence and heavy radio traffic, to be controlled by higher headquarters.
6. During the periods when radio is being used, it should be used to the full extent. In order to effect this, it may be necessary to use dummy cipher or code traffic.
7. During exercises, radio schemes should be made as deceptive as possible. This can be accomplished by:
 - a. The use of false call signs.
 - b. The use of false code names.
 - c. Altering the location of sets.
 - d. Any other method improvised by the signal or communication officer.
8. All radio telegraph messages should be in code except, when coding delays cannot be tolerated, and the enemy will have no time to take effective action on the message if he does intercept it.
9. The risks involved in sending a message in clear must be considered by the originator, who must decide whether the urgency is such that the risk should be taken.

C. Radiotelephony.

1. Radiotelephone may be used only by officers authorized to send messages in the clear.
2. The use of radiotelephone requires considerable attention and practice to avoid giving away valuable information by the careless mention of times, places, and names of units. The danger can be largely overcome by thinking out the wording of the message, and making notes of it, before starting a conversation. Whenever possible, refer to the orders and instructions issued by the unit. This practice reveals nothing to the enemy. Prearranged code words and phrases may be employed to describe positions and actions. Conversations should be kept as brief as possible.
3. Radiotelephone should be used only for training purposes.
4. Radiotelephone should not be used for operational or administrative purposes.
 - a. The exception is when the enemy will not have time to take effective action on the message if it is intercepted. The risks involved must be outweighed by the necessity and the advantages to be gained.

VII. CODE NAMES AND RADIO CALL SIGNS AND FREQUENCIES.

- A. Code names will be allotted by the General Staff for the use of units and organizations of a field force. As a general rule, the use of code names will be confined to divisional areas. Should any unit be moved into a divisional area, the headquarters ordering the move must insure that the unit concerned is allotted a code name from the spare ones allotted in the Corps or Divisional list concerned. Normally code names will be used forward of Corps Headquarters. In calculating the distribution of code name lists, care must be taken to include the requirements of branches of staffs, signal offices, and codes. A sufficient supply of spare copies should also be issued.
1. Each signal office down to Corps Headquarters (inclusively) should receive from its higher headquarters three complete lists of the higher units.
 2. Each headquarters of divisional signals should receive from its higher headquarters sixteen copies of its own corps and divisional lists.
 3. Each brigade signal office should receive from its higher headquarters two divisional lists and extracts from the corps list to include all artillery and machine gun units in the divisional area, whether under command of or in support of the division.
 4. Each unit signal office (or sub-unit with radio telephone) should receive from its unit headquarters one divisional list.
 5. Each radiotelephone terminal should receive from its signal office the code names of certain other radiotelephone terminals. The number necessary for each terminal varies. In artillery units, it will necessarily be generous, and must include the code names of the infantry brigade (and battalions) with which the regiment is working, together with the code names of other artillery units in or working with, the divisional artillery.
- B. To reduce the possibility of compromise of the deployment of the organization, which would result in the loss or capture of code name lists, divisional headquarters and units forward of these headquarters will not be issued the complete lists of the whole force. They will receive lists containing only the code names of their own organizations and units, and the necessary names of flanking and cooperating organizations and units.
- C. When a relief of units is being carried out, the relieving organization of the unit will normally be ordered to take over the existing code names of the outgoing troops.
- D. If code names are changed, but call signs and frequencies remain unaltered, the enemy intercept unit will equate a new code name to an old one immediately any traffic containing the new code name is passed. If the enemy is to be puzzled at all, code names, call signs and frequencies must be changed simultaneously. As a guide, it is recommended that the change should take place at least twice a month and at irregular intervals.

- E. There may be a time when a commander of a force considers that for security reasons code names must be allotted to the entire force; this however should prove an exception to the above statements.
- F. Loss or compromise of code names, codes, etc. must be reported immediately to higher echelon.

VIII. WIRE COMMUNICATION.

- A. No wire line can be guaranteed immune from "tapping", a constant inspection must be maintained. Telegraph equipment and field telephones can be overheard by "tapping".
- B. A teletypewriter must be used to tap a teletypewriter line.
- C. Care should be exercised as to what is said over the telephone. Where allotted, code names should always be used, and, if a subject which would prove of use to the enemy is to be discussed, a prearranged code should be used. Conversations should be as brief as possible.
- D. While common sense, allied with sound appreciation of local conditions, must always be the best guide as to how a certain message is to be sent, the following guides are submitted:
 - 1. When the originator signs a message "Send in Clear", the operators are entitled to send the message concerned by any means at their disposal without regard to security.
 - 2. When a message contains information valuable to the enemy and is sent over any system which the enemy may have access to, it must be encoded. Such messages, however, may be dispatched by messenger, but are never phoned from signal terminals in the forward areas.
 - 3. Transmission by telegraph is normally considered safe, but should the chief operator concerned have any grounds whatever for suspicion that the lines over which he is working may be tapped, he will have the message encoded before transmission.
 - 4. Should the originator decide that the contents of his message are of such importance from a security point of view, that the message must be sent in code regardless of the method by which it is being sent, he will fill in the words "To be Encoded" over his initials.
 - 5. Joint Army and Navy procedure (JANP), FM 24-10, is prescribed for all Army-Navy use, and is the foundation and basic text for radio procedure within the Army. Be thoroughly familiar with these instructions. If no provision has been made to cover a desired communication function, resort to initiative and common sense with due regard for the requirements of reliability, speed, and security.

IX. RANGE OF RADIO SETS.

A. Range has a direct bearing on radio security. The following points should be borne in mind:

1. The nominal range of a radio set is that maximum range over which two sets of the same type will give reliable communication under the normal conditions which are applicable in any particular locality. In practice it is found that the range varies to a certain extent according to whether the ground is dry or moist, or whether it is composed of earth, sand or rock, mineral deposits; time of day; location; lay-out; electrical interferences; storms; structures; etc.
2. In order to obtain the best ranges, radio sets must be accurately tuned, thus getting maximum output. Even the slightest inaccuracies in tuning will cause drastic reductions in ranges.
3. Radio sets have the peculiar property that although usually they cannot provide reliable communication much beyond their normal ranges, they can under special conditions provide communication at very much greater ranges. Therefore, it must never be assumed that because a radio set has a certain nominal range, and the enemy is outside this range that radio security can be ignored. It must always be assumed that the enemy is able to intercept every message sent by radio.

X. MESSAGE CENTER.

- A. The message center is the agency, of the commander at headquarters or at the command post, which is charged with the receipt, transmission and delivery of messages.
- B. During active operations message center service is continuous.
- C. When an echelon moves, the message center opens at the new location prior to or at the same time of the closing of the message center at the former location.
- D. The message center and routes leading thereto should be well marked with appropriate signs.
- E. Message center requirements:
 1. Quiet.
 2. Protected from rain and wind.
 3. Capable of being made lightproof at night and gasproof at any time.
 4. Convenient to staff sections and to incoming messengers.
 5. An alternate location should be selected.
 6. Efficient protection should be provided against enemy raids, observed fire, bombing, etc.

7. Personnel should have prior investigation.
8. AR 380-5 should be enforced.

F. Means of signal communications.

1. Messages to go only a very short distance should be habitually sent by messenger.
2. Maps, documents, photographs, and similar messages must be sent by messenger.
3. Short messages going a comparatively long distance should be sent by some electrical means where available.
4. Whenever possible, telegrams or telegraphic printer should be used. The telephone should be used as little as possible in order that it may be kept open for direct communications by the commander and his staff.
5. Very long messages should usually be sent by messengers.
6. Messages transmitted by radio are subject to interception by an alert enemy. It is, therefore, essential to encode all such messages.
7. If the importance of the message so warrants, it may be sent by two or more means subject to the restrictions imposed by cryptographic security.
8. Urgent and Priority messages are sent by the most rapid means available.
9. Routine and Administrative reports must be transmitted by means other than radio or telephone.
10. Maximum delay time in message centers should never be more than two minutes.
11. The training of message center personnel will emphasize:
 - a. Military courtesy with special reference to expressions used in accepting and delivering messages.
 - b. Organization of the Unit and the numerical designation of subordinate and superior units.
 - c. Staff organization, particularly the organization and personnel at local headquarters.
12. When a message is handed to the message center to be sent, the following information is entered on both copies:
 - a. Time filed. (The exact hour and minute message was received).

- b. Message center serial number. (The next higher number above that on the last message sent during the current day.)
 - c. How sent. (The means directed by the writer or selected by the message center chief for transmittal.)
- 13. The message center keeps only such temporary files, so as to insure rapid and accurate handling of message traffic:
 - a. Live file.
 - b. Dead file.
 - c. Code clerk file.
 - d. Operator's file.
 - e. The dead file is used in preparing the unit journal. The code clerk's file and the transmitting operator's file are kept in a packet marked with the date and description of contents and held for such disposition as may be directed by the unit communication officer.
- 14. The message center will be called upon to handle many different types of messages, all of which will perhaps require a slight variation in procedure. For example, the steps involved in the routing of an outgoing cryptogram sent by radio would be:
 - a. The writer prepares three copies of the message.
 - b. Sends the original and duplicate to the message center chief and keeps the third copy for his own file.
 - c. The message center chief processes the message and sends the original on to the code clerk, filing the duplicate in his live file.
 - d. The code clerk cryptographs the message, entering necessary instruction for the radio operator to insure correct transmission of the message.
 - e. The radio operator receives the cryptogram from the code clerk and transmits it to the proper station.
 - f. The radio operator notifies the message center chief of the time of receipt, services the coded message, and files it in his operator's file.
 - g. The message center chief services the duplicate copy of the message and removes it from the live file and places it in the dead file.

-- FOR FURTHER INFORMATION --

- FM 24-5 Signal Communications.
- FM 24-6 Radio Procedure.
- FM 24-10 Joint Army and Navy Radio Procedure.
- FM 11-10 Organization and Operations in the Infantry
Division.
- FM 101-10 Staff Officer's Field Manual.
- TM 11-454 The Radio Operator.